

Application No.: 10/806556  
Docket No.: EL0508USNA

Page 6

**REMARKS**

Claims 1-5 were in the application as originally filed. Claims 4 and 5 have been withdrawn from consideration due to a restriction requirement which has been made final. Claim 3 and Claims 6-13 have been previously submitted. New Claims 14 -16 have been added. The specification has been amended to correct a misspelling error in the spelling of the term "cool-down".

The specification has been amended at page 11 to correct a spelling error in the term "cool-down".

**REJECTION UNDER 35 USC 102(b) and 103(a)**

Claims 1-3 and 6-9 and 11-13 were rejected under 35 USC 102(b) as anticipated or in the alternative as obvious over Okamoto et al. (US 5,616,173), Carroll et al (US 5,162,062) or Oba et al. (US 5,670,089).

The Examiner maintains his rejection and asserts that Okamoto et al. disclose a thick film paste composition consistent with applicant's claim limitations.

Applicant respectfully disagrees. Independent Claim 1 and sequential claims are now directed to a conductive composition consisting of (a) 50-95% finely divided particles of an electrically-conductive material dispersed in (b) a liquid vehicle, for use in the manufacture of an electrically-conductive pattern on a substrate for the use of reducing cross-sectional area and width while retaining conductivity and resistivity for automotive uses. Independent Claim 2 is directed to a conductive composition comprising (a) finely divided particles of an electrically-conductive material; (b) an inorganic binder selected from lead borates, lead silicates, lead borosilicates, cadmium borate, lead cadmium borosilicates, zinc borosilicates, sodium cadmium borosilicates, bismuth silicates, bismuth borosilicates, bismuth lead silicates, bismuth lead borosilicates, oxides or oxide precursors of metals, and mixtures thereof; dispersed in (c) a liquid vehicle wherein the total composition contains 50-95% by weight solids and wherein said inorganic binder is present at less than 1% of the total solids in the composition., also amended to stress the automotive uses. Dependent Claims 13 and 14, depending from Claim 2 include a binder of less than 0.5% and 0.3%.

Okamoto et al (5,616,173) discloses thick film paste composition used to apply a conductive pattern. As stated in column 3, lines 6-8, the total amount of inorganic binder composition is usually 1 to 20 wt %, and preferable 1 to 10 wt %, of the solid portion of the composition. Please note, that the presently claimed composition of Claim 1 does not contain

Application No.: 10/806556  
Docket No.: EL0508USNA

Page 7

an inorganic binder and the composition of Claims 2 and 14-16 contains inorganic binder at less than 1.0 % of the total solids in the composition. This is outside of the limitation of Okamoto.

Okamoto teaches a thick film paste composition for applying conductive patterns, comprising (a) spherical, non-coagulating fine particles of metallic silver having a surface area/weight ratio of at least  $1.1 \text{ m}^2/\text{g}$  and having a particle size of  $1.0 \text{ }\mu\text{m}$  or less, and having a critical pigment volume concentration of at least 56%, and (b) fine particles of a glass frit having a softening point of  $350^\circ$  to  $620^\circ\text{C}$  and contained in an amount of 2.1 weight parts or less per 100 weight parts of metallic silver, wherein (a) and (b) are dispersed in (c) an organic medium. Dependent claims further claim a coloring agent selected from the group consisting metal resinate, boron and boride compounds.

Nowhere in Okamoto is a composition that does not contain an inorganic binder described. As outlined below, a *prima facie* case of obviousness has not been met. In Okamoto, the inorganic binder is 1-20%, preferably 1-10% of the solids in the composition. In the instant Claim 2, the claim in the instant case where there is an inorganic binder, the inorganic binder is less than 1.0% of the total solids in the composition. Dependent Claim 14 limit inorganic binder to less than 1%. These ranges fall outside of the range of binder taught by Okamoto.

Applicants maintain that Okamoto does not anticipate the presently claimed composition. Furthermore, applicants maintain that a *prima facie* case of obviousness has not been established with respect to Okamoto. Accordingly, applicants respectfully request that the rejection be withdrawn.

According to the MPEP § 2142, in order to establish a *prima facie* case of obviousness, first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Applicants respectfully submit that none of the requirements for a *prima facie* case of obviousness are met by Carroll *et al.*, Okamoto *et al.*, or Oba *et al.*, as none of the references teach a composition lacking the inorganic binder which exhibits good adhesion to the substrate, and avoids or minimizes disadvantages, such as cracking of the enamel. However, the presently claimed composition, Claim 1, does not

Application No.: 10/806556  
Docket No.: EL0508USNA

Page 8

contain an inorganic binder, or contains inorganic binder at less than 1% of the total solids in the composition (described in claim 2).

Furthermore, regarding the first requirement, Carroll *et al.* does not provide motivation to modify the described invention to make the presently claimed composition described by Claim 1. Regarding the second requirement, one skilled in the art would not have a reasonable expectation of success in making the presently claimed composition, based on Carroll *et al.* Regarding the third requirement, Carroll *et al.* does not teach or suggest all the claim limitations; for example, Carroll *et al.* does not describe compositions which contain no inorganic binder, or inorganic binder less than 1% of the total solids in the composition. Accordingly, applicants respectfully request that this rejection be withdrawn.

Carroll *et al.* is directed to a method of making a multilayer electronic circuit comprising very specific steps. The present invention relates to a composition, either without or with less than 1%, preferably less than 0.5%, preferably less than 0.3% and more preferably less than 0.1% of inorganic binder, and its use in heating elements. Nowhere in Carroll *et al.* does it teach that adhesion can be obtained without, or with less than 0.5%, of an inorganic binder.

Additionally, Carroll *et al.* is cited as disclosing conductor paste formulations containing silver, organic vehicle and frit. Carroll *et al.* discloses compositions in Table 5; however, Carroll *et al.* does not describe compositions which contain inorganic binder less than 0.5% of the total solids in the composition. Furthermore, Carroll *et al.* describes the use of a sintering inhibitor. In addition, the formulation of Carroll is used for making a multilayer electronic circuit. The present invention does not relate to a multilayer electronic circuit. The presently claimed composition does not contain an inorganic binder (described in claim 1), or contains inorganic binder at less than 0.5% of the total solids in the composition (described in claim 2).

Also, Carroll *et al.* is cited as disclosing conductor paste formulations containing silver, organic vehicle and frit. The Examiner asserts that the examples disclosed in Table 5 of Carroll meet the limitations of the present claims. Carroll teaches a method for making multilayer electronic circuits comprising the sequential steps of: A. applying to the exposed surface of a substrate comprising a plurality of alternating layers of inorganic dielectric material and thick film conductor a layer of thick film dielectric paste comprising finely divided particles of amorphous glass containing by weight at least 25% SiO<sub>2</sub> and having a softening point below the maximum firing temperature of step (3) hereinbelow; and B.

Application No.: 10/806556  
Docket No.: EL0508USNA

Page 9

applying to the thick film dielectric layer of step A. a patterned layer of thick film conductor paste comprising finely divided particles of (1) a silver containing metal selected from Ag, alloys and mixtures of Ag with a minor amount of Pd and/or Pt and mixtures thereof, the silver-containing particles having a maximum particle size of 20 microns, a surface area of at least  $0.1 \text{ m}^2/\text{g}$ ; (2) an amorphous glass binder having a Dilatometer softening point of  $150^\circ\text{--}800^\circ\text{C}$ . comprising at least two metal oxides selected from  $\text{PbO}$ ,  $\text{B}_2\text{O}_3$ ,  $\text{SiO}_2$  and  $\text{Bi}_2\text{O}_3$  and up to 45% wt. of glass modifier selected from oxides of alkali metals, alkaline earth metals, transition metals, and mixtures thereof, (3) a sintering inhibitor selected from oxides of ruthenium and rhodium, mixtures and precursors thereof, the amount of the sintering inhibitor relative to the amount of conductive metal falling within the area defined by points A through D of FIG. 1, all of (1), (2) and (3) being dispersed in an organic medium; and C. air co firing the applied layers of thick film dielectric and thick film conductive pastes to effect volatilization of the organic medium from both layers, softening of the glass binder and sintering of the metal particles in the thick film conductor layer and densification of the glass in the thick film dielectric layer.

Applicants maintain that Carroll et al. does not anticipate the claimed invention, and respectfully request that the rejection be withdrawn. Furthermore, applicants maintain that a prima facie case of obviousness has not been established with respect to Carroll et al.

Oba et al. discloses terminal electrode composition for multiple-layered capacitor made of precious metal particles and 0.5-7 wt. % of an inorganic binder. Furthermore the inorganic binder of Oba discloses suitable frits which contain  $\text{PbO}$  (column 2, ll 52-60, and Table 1 of the Examples). The present invention, when inorganic binder is included, does not require a  $\text{PbO}$  containing frit. Furthermore, the composition of claim 1 does not contain an inorganic binder.

Oba, US 5,670,089, is also cited by the Examiner as disclosing the present Invention, either specifically or inherently. Oba teaches a terminal electrode composition for a multiple-layered capacitor, characterized by being made of precious metal particles and 0.5 to 7 wt. % (based on the weight of the precious metal particles) of an inorganic binder having a  $400^\circ\text{--}500^\circ\text{C}$ . glass transition point and a  $400^\circ\text{--}550^\circ\text{C}$  glass softening point, wherein said inorganic binder comprises 15-30 wt. %  $\text{SiO}_2$ , 1-18 wt. %  $\text{B}_2\text{O}_3$ , 35-70 wt. %  $\text{PbO}$  and 5-20 wt. % of at least one oxide selected from the group consisting of  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$  and  $\text{TiO}_2$ . Dependent claims of Oba cover compositions wherein said inorganic binder further comprises 1-20 wt. % of at least one oxide selected from the group consisting of  $\text{ZnO}$  and  $\text{CuO}$ , and

Application No.: 10/806556  
Docket No.: EL0508USNA

Page 10

0.5-10 wt. % of at least one oxide selected from the group consisting of  $\text{Na}_2\text{O}$  and  $\text{Li}_2\text{O}$ ; wherein said inorganic binder further comprises an additional 0.01-3 wt. % of at least one oxide selected from the group consisting of  $\text{Al}_2\text{O}_3$ ,  $\text{ZrO}_2$  and  $\text{TiO}_2$  and wherein said precious metal particles are silver, and wherein said silver particles have a particle size of 0.05 to 10 microns.

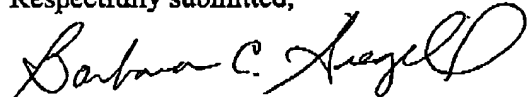
As noted above, the present invention, when inorganic binder is included, does not require a  $\text{PbO}$  containing frit as in Oba and the composition of Applicants' claim 1 does not contain an inorganic binder. Applicants maintain, therefore, that Oba does not anticipate the presently claimed invention. Furthermore, applicants maintain that a prima facie case of obviousness has not been established with respect to Oba.

Applicants maintain that, in view of the present amendments, the rejections are rendered moot. Applicants respectfully request that the rejections be withdrawn. Allowance of Claims 1-3 and 6-15 is respectfully requested. It is further requested that the restriction of Claims 4 and 5 be reconsidered and that these claims be rejoined to this application.

If any additional fees are due, please charge the fees to Deposit Account No. 04-1928 (E. I. du Pont de Nemours and Company) in order to complete the requirements.

If anything further is needed to advance the prosecution of this application, , the Examiner is urged to contact applicant's attorney. In view of the foregoing amendments and arguments, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,



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